

附录 A

表 A1 满足恒流输出的谐振补偿网络结构

Table A1 The resonant compensation networks for constant current output

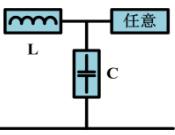
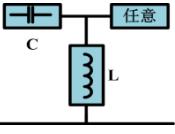
序号	谐振补偿网络结构	谐振角频率
恒流 1		$\omega = \sqrt{\frac{1}{LC}}$
恒流-2		$\omega = \sqrt{\frac{1}{LC}}$

表 A2 满足恒压输出的谐振补偿网络结构

Table A2 The resonant compensation networks for constant voltage output

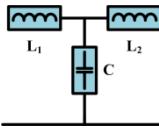
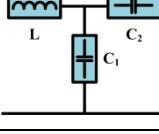
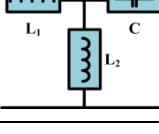
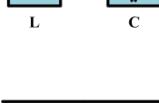
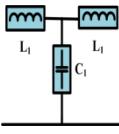
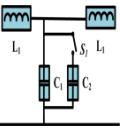
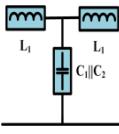
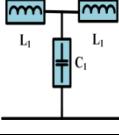
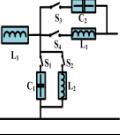
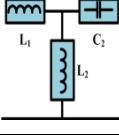
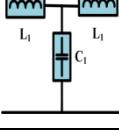
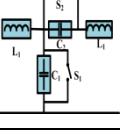
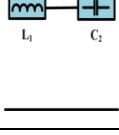
序号	谐振补偿网络结构	谐振角频率
副边恒压-1		$\omega = \sqrt{\frac{1}{L_1 C} + \frac{1}{L_2 C}}$
副边恒压-2		$\omega = \sqrt{LC_1 + LC_2}$
副边恒压-3		$\omega = \sqrt{\frac{1}{L_1 C} + \frac{1}{L_2 C}}$
副边恒压-4		$\omega = \sqrt{\frac{1}{LC}}$

表 A3 三套满足输出恒流模式向恒压模式切换的方案

Table A3 Three sets of switching schemes from constant current mode to constant voltage mode

序号	恒流模式 谐振补偿网络结构	切换方案	恒压模式 谐振补偿网络结构	切入/切出参数	谐振角频率
1				$C_2 = C_1$	$\omega = \sqrt{\frac{1}{L_1 C_1}}$
2				$C_2 = 2C_1$	$L_2 = L_1$
3				$C_2 = C_1 / 2$	$\omega = \sqrt{\frac{1}{L_1 C_1}}$

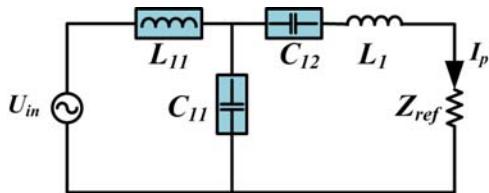


图 A1 原边等效电路图

Fig.A1 The equivalent circuit diagram of primary side

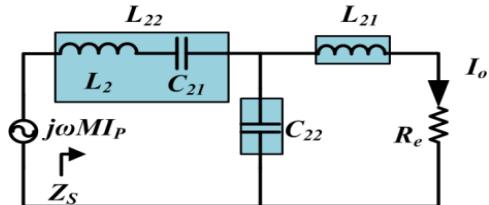


图 A2 开关闭合时副边等效电路图

Fig. A2 The equivalent circuit of secondary side when the switches are close

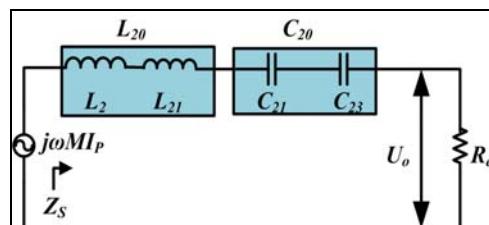


图 A3 开关打开时副边等效电路图

Fig. A3 The equivalent circuit of secondary side when the switches are open

表 A4 无线充电系统电气参数

Table A4 Parameters of the wireless charging system

系统参数	参数值	系统参数	参数值
L_1	232.95μH	L_2	219.7μH
L_{11}	19.5μH	L_{21}	79.6μH
C_{11}	179.6 nF	C_{21}	44.1 nF
C_{12}	16.439nF	C_{22}	25.1nF
R_e	37.5 -226.7 Ω	C_{23}	15.96nF
f	85kHz	M	25.36μH

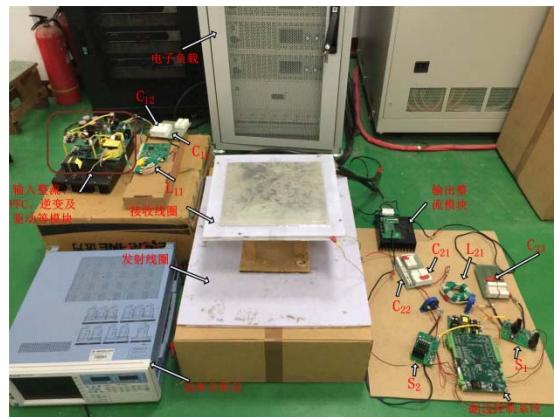


图 A4 实验装置图

Fig. A4 Experiment photo

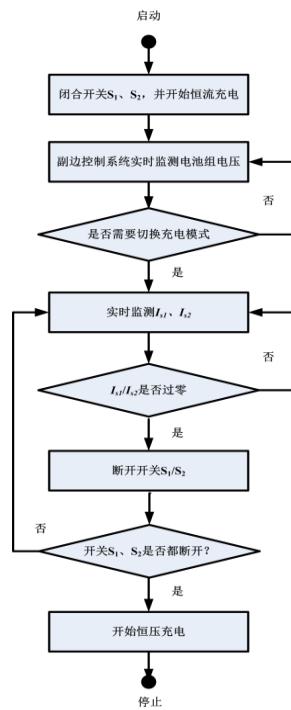


图 A5 开关切换流程图

Fig. A5 The diagram of switching process

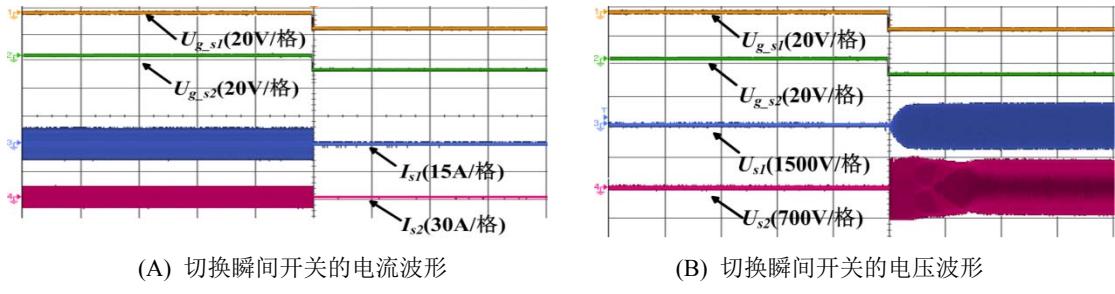


图 A6 切换瞬间开关 S_1 和 S_2 的电流和电压波形图

Fig. A6 The current and voltage waveforms of the switchs S_1 and S_2 at the switching moment

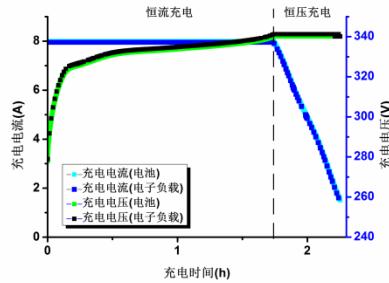


图 A7 电子负载和电池的充电电压和电流随充电时间的变化曲线图

Fig. A7 Charging current and voltage of the battery and electronic load versus charging time